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EXAMINER	
COLUCCI, MICHAEL C	

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2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,640	MARTIN, SVEN C.	
	Examiner	Art Unit	
	MICHAEL C. COLUCCI	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *5/9/06*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-15* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *09 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☒ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As per the claims, the language:

"<u>calculating a mapping probability that a semantic tag of a set of candidate semantic tags is assigned to a phrase, wherein the calculation of the mapping probability is performed by means of a statistical procedure based on a set of phrases constituting a corpus of sentences, each of the phrases having assigned a set of candidate semantic tags</u>"

do not transform the claimed subject matter into statutory subject matter. The recital is merely a field of use or desired end use limitation. A mathematical algorithm is not made statutory by "attempting to limit the use of the formula to a particular technological environment." <u>Diehr</u>, 450 U.S. at 191, 209 USPQ at 10. Thus, "field of use" or "end of use" limitations in the claim preamble are insufficient to constitute a statutory process.

Claims 1-15 directly recite a mathematical algorithm by setting forth the steps of:

- calculating a mapping probability that a semantic tag of a set of candidate semantic tags is assigned to a phrase,

- the calculation of the mapping probability is performed by means of a statistical procedure based on a set of phrases constituting a corpus of sentences
- each of the phrases having assigned a set of candidate semantic tags

These steps are mathematical in nature.

Claims to processes that do nothing more than solve mathematical problems or manipulate abstract ideas or concepts are complex to analyze and are addressed herein.

If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Benson, 409 U.S. at 71-72, 175 USPQ at 676. Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

The claimed subject matter must contain more than 35 USC 101 judicial material, such as an application which involves the 101 subject matter. Particularly, there must be a result that is useful, tangible, and concrete. The claimed subject matter within claims 1-15 contains material that lack tangibility, where a real world result is produced. Examiner takes the position that the recited claims 1-15 are merely <u>mathematical in nature</u>, where the process of "<u>calculating a mapping probability that a semantic tag of a set of candidate semantic tags is assigned to a phrase, wherein the calculation of the mapping probability is performed by means of a statistical procedure based on a set of</u>

phrases constituting a corpus of sentences, each of the phrases having assigned a set of candidate semantic tags" does not produce a tangible result.

FURTHER:

The claimed invention is directed to non-statutory subject matter.

Claims 6-10 disclose a "computer program product" with no description or clear support of a computer program product positively disclosed in the specification. Therefore, with no disclosure of a computer product within the specification, a computer program product can be interpreted as a computer program, which does not fall under one of the statutory categories under 35 USC 101 as patent eligible subject matter, where computer program or computer program product does not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brill et al. US 20020169596 A1 (hereinafter Brill) in view of Schabes et al. US 5537317 A (hereinafter Schabes).

Re claims 1, 6, and 11, Brill teaches a method of calculating a mapping probability that a semantic tag of a set of candidate semantic tags is assigned to a phrase ([0025]), wherein the calculation of the mapping probability is performed by means of a statistical procedure based on a set of phrases constituting a corpus of sentences ([0024]), each of the phrases having assigned a set of candidate semantic tags ([0028])

However, Brill fails to teach mapping probability that is performed by means of a statistical procedure based on a set of phrases

Schabes teaches well known previous techniques, wherein in the past, in order to ascertain proper usage, the grammaticality of a sentence was computed as the probability of this sentence to occur in English. Such statistical approach assigns high probability to grammatically correct sentences, and low probability to ungrammatical sentences. The statistical is obtained by training on a collection of English sentences, or a training corpus. The corpus defines correct usage. As a result, when a sentence is typed in to such a grammar checking system, the probability of the entire sentence correlating with the corpus is computed. It will be appreciated in order to entertain the entire English vocabulary, about 60,000 words, a corpus of at several hundred trillion words must be used. Furthermore, a comparable number of probabilities must be

stored on the computer. Thus the task of analyzing entire sentences is both computationally and storage intensive (Schabes Col. 8 lines 12-28).

Further, Schabes overcomes previous techniques, wherein rather than comparing the above mentioned probabilities, in a preferred embodiment, the subject system compares the geometric average of these probabilities by taking into account their word lengths, i.e. by comparing the logarithm of P1 divided by the number of words in S1, and the logarithm of P2 divided by the number of words in S2. This is important in cases where a single word may be confused with a sequence of words such as "maybe" and "may be". Directly comparing the probabilities of the part of speech sequences would favor shorter sentences instead of longer sentences, an not necessarily correct result, since the statistical language model assigns lower probabilities to longer sentences (Schabes Col. 9 lines 55-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Brill to incorporate mapping probability that is performed by means of a statistical procedure based on a set of phrases as taught by Schabes to allow for the recognition of parts of speech and individual in addition to the identification of sentences/phrases, wherein higher/lower probabilities are assigned to sentences and the length of the sentences in an unsupervised or even supervised system (Schabes Col. 9 lines 55-67).

Re claims 2, 7, and 12, Brill teaches the method according to claim I, for each phrase further comprising calculating a set of mapping probabilities ([0025]), providing

the probability for each semantic tag of the set of candidate semantic tags being assigned to the phrase ([0028]).

However, Brill fails to teach providing the probability for each semantic tag of the set of candidate semantic tags

Schabes teaches well known previous techniques, wherein in the past, in order to ascertain proper usage, the grammaticality of a sentence was computed as the probability of this sentence to occur in English. Such statistical approach assigns high probability to grammatically correct sentences, and low probability to ungrammatical sentences. The statistical is obtained by training on a collection of English sentences, or a training corpus. The corpus defines correct usage. As a result, when a sentence is typed in to such a grammar checking system, the probability of the entire sentence correlating with the corpus is computed. It will be appreciated in order to entertain the entire English vocabulary, about 60,000 words, a corpus of at several hundred trillion words must be used. Furthermore, a comparable number of probabilities must be stored on the computer. Thus the task of analyzing entire sentences is both computationally and storage intensive (Schabes Col. 8 lines 12-28).

Further, Schabes overcomes previous techniques, wherein rather than comparing the above mentioned probabilities, in a preferred embodiment, the subject system compares the geometric average of these probabilities by taking into account their word lengths, i.e. by comparing the logarithm of P1 divided by the number of words in S1, and the logarithm of P2 divided by the number of words in S2. This is important in cases where a single word may be confused with a sequence of words such as

"maybe" and "may be". Directly comparing the probabilities of the part of speech sequences would favor shorter sentences instead of longer sentences, an not necessarily correct result, since the statistical language model assigns lower probabilities to longer sentences (Schabes Col. 9 lines 55-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Brill to incorporate the probability for each semantic tag of the set of candidate semantic tags as taught by Schabes to allow for the recognition of parts of speech and individual in addition to the identification of sentences/phrases, wherein higher/lower probabilities are assigned to sentences and the length of the sentences in an unsupervised or even supervised system (Schabes Col. 9 lines 55-67).

Re claims 3, 8, and 13, Brill teaches the method according to claim 2, further comprising determining one semantic tag of the set of candidate semantic tags ([0025]) having the highest mapping probability of the set of mapping probabilities and mapping the one semantic tag to the phrase ([0024])

However, Brill fails to teach determining one semantic tag of the set of candidate semantic tags having the highest mapping probability

Schabes teaches well known previous techniques, wherein in the past, in order to ascertain proper usage, the grammaticality of a sentence was computed as the probability of this sentence to occur in English. Such statistical approach assigns high probability to grammatically correct sentences, and low probability to ungrammatical

sentences. The statistical is obtained by training on a collection of English sentences, or a training corpus. The corpus defines correct usage. As a result, when a sentence is typed in to such a grammar checking system, the probability of the entire sentence correlating with the corpus is computed. It will be appreciated in order to entertain the entire English vocabulary, about 60,000 words, a corpus of at several hundred trillion words must be used. Furthermore, a comparable number of probabilities must be stored on the computer. Thus the task of analyzing entire sentences is both computationally and storage intensive (Schabes Col. 8 lines 12-28).

Further, Schabes overcomes previous techniques, wherein rather than comparing the above mentioned probabilities, in a preferred embodiment, the subject system compares the geometric average of these probabilities by taking into account their word lengths, i.e. by comparing the logarithm of P1 divided by the number of words in S1, and the logarithm of P2 divided by the number of words in S2. This is important in cases where a single word may be confused with a sequence of words such as "maybe" and "may be". Directly comparing the probabilities of the part of speech sequences would favor shorter sentences instead of longer sentences, an not necessarily correct result, since the statistical language model assigns lower probabilities to longer sentences (Schabes Col. 9 lines 55-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Brill to incorporate the probability for each semantic tag of the set of candidate semantic tags as taught by Schabes to allow for the recognition of parts of speech and individual in addition to the identification of

sentences/phrases, wherein higher/lower probabilities are assigned to sentences and the length of the sentences in an unsupervised or even supervised system (Schabes Col. 9 lines 55-67).

Re claims 4, 9, and 14, Brill teaches the method according to claim 1, wherein the statistical procedure comprises an expectation maximization algorithm ([0028]).

Re claims 5, 10, and 15, Brill teaches the method according to claim 3 or 4, further comprising storing of performed mappings between a candidate semantic tag ([0025]) and a phrase in form of a mapping table ([0024]) in order to derive a grammar being applicable to unknown sentences or unknown phrases.

However, Brill fails to teach deriving a grammar being applicable to unknown sentences or unknown phrases

Schabes teaches well known previous techniques, wherein in the past, in order to ascertain proper usage, the grammaticality of a sentence was computed as the probability of this sentence to occur in English. Such statistical approach assigns high probability to grammatically correct sentences, and low probability to ungrammatical sentences. The statistical is obtained by training on a collection of English sentences, or a training corpus. The corpus defines correct usage. As a result, when a sentence is typed in to such a grammar checking system, the probability of the entire sentence correlating with the corpus is computed. It will be appreciated in order to entertain the entire English vocabulary, about 60,000 words, a corpus of at several hundred trillion

words must be used. Furthermore, a comparable number of probabilities must be stored on the computer. Thus the task of analyzing entire sentences is both computationally and storage intensive (Schabes Col. 8 lines 12-28).

Further, Schabes overcomes previous techniques, wherein rather than comparing the above mentioned probabilities, in a preferred embodiment, the subject system compares the geometric average of these probabilities by taking into account their word lengths, i.e. by comparing the logarithm of P1 divided by the number of words in S1, and the logarithm of P2 divided by the number of words in S2. This is important in cases where a single word may be confused with a sequence of words such as "maybe" and "may be". Directly comparing the probabilities of the part of speech sequences would favor shorter sentences instead of longer sentences, an not necessarily correct result, since the statistical language model assigns lower probabilities to longer sentences (Schabes Col. 9 lines 55-67).

Furthermore, Schabes teaches that in particular importance in grammar checking is the ability to detect the sequence of parts of speech as they exist in a given sentence. Correct sentences will have parts of speech which follow a normal sequence, such that by analyzing the parts of speech sequence one can detect the probability that the sentence is correct in terms of its grammar. While prior art systems have tagged a sentence for parts of speech and have analyzed the sequences of parts of speech for the above mentioned probability, these probability have never been utilized in grammar checking and correcting system (Schabes Col. 3 lines 14-25 & Fig. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Brill to incorporate deriving a grammar being applicable to unknown sentences or unknown phrases as taught by Schabes to allow for the analysis of any input, particularly in any language and being able to not only translate but interpret the semantic and syntactic structure of discourse, wherein probabilities that check if grammar is correct based on a sequential sentence input (Schabes Col. 3 lines 14-25 & Fig. 1).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 20040044530 A1, US 5477451 A.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)-270-1847. The examiner can normally be reached on 9:30 am - 6:00 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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